



**STRATEGY
RESEARCH
PROJECT**

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**INCREASING THE ADAPTABILITY
OF DOD FORCES AND ORGANIZATIONS**

BY

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INCREASING THE ADAPTABILITY OF DOD FORCES AND ORGANIZATIONS

by

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ABSTRACT

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The post-Cold War world demands increased adaptability. Since the accelerating pace of technological change reduces DOD ability to forecast threat characteristics, DOD force planning methodology is undermined. One replacement methodology may be to increase adaptability in DOD forces and organizations so that they can better cope with surprises. To succeed in increasing adaptability, one must recognize what it looks like and when it is called for. To this end, this paper outlines a broad framework for understanding adaptability – one that can accommodate the many rich but often narrow conceptions of adaptability that currently exist. This paper then introduces two very different theories of adaptability (those of Michael Conrad and Ronald Heifetz) and examines their application to and implications for the military. These theories are applied to the case study of China, which failed to adapt four hundred years ago, yielding world hegemony to Europe despite its significant technological head start.

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INCREASING THE ADAPTABILITY OF DOD FORCES AND ORGANIZATIONS

This paper has three aims. First, it contends that adaptability matters, but that adaptability is neglected, and this neglect must change. Second, this paper outlines a broad framework for understanding adaptability – one that can accommodate the many rich, but often narrow, conceptions of adaptability that currently exist. Third, this paper introduces two very different theories of adaptability (those of Michael Conrad and Ronald Heifetz) and examines their application to and implications for the military.

THE NEED TO INCREASE ADAPTABILITY

The United States Department of Defense (DoD) is charged with defending the United States (U.S.) from threats to national interests.¹ DoD's understanding of how to execute its own mission is limited by how well it understands the threats it must defend against. The U.S. consequently devotes many resources towards that goal.² However, the ability to understand is being undermined by the accelerating pace of change in the world. Alvin Toffler spends the first two chapters of his book Future Shock well documenting exponential rates of change in population size, energy use, economic growth, output of goods and services, transportation, and science.³ This dynamic confronts policymakers daily, as indicated by CIA director George Tenet's recent Senate testimony:

As I reflect...on the threats to American security, what strikes me most forcefully is the accelerating pace of change in so many arenas...Never have we had to deal with such a high quotient of uncertainty.⁴

The accelerating pace of change reduces our ability to predict future threats, which affects our strategy in several ways.⁵ A decrease in our ability to predict threats reduces our ability to know if DoD is oriented correctly towards doing the right things, protecting the right interests, embodying the right values, and providing genuine security to the nation. Also, the way we plan and program forces depends on forecasting⁶ because it takes years to design and procure a weapon system.⁷ Therefore a reduction in our forecasting ability necessitates a change in our planning and programming methodology.⁸

Increasing the adaptability of DoD, military services, and fielded forces could mitigate the adverse effects of an accelerating change. From a strategic perspective, high levels of adaptability in military forces and organizations may increase the suitability of the "means" to support the "ways" and "ends" of our national security strategy.

As organizations, DoD and the military services continually adapt to changes in their environments. Appropriate adaptations might include changes in strategy, services provided, and organizational structure, size, and culture. Persistent questions by military services about whether or not that service is "relevant" reflects this requirement to adapt.

How shall we procure forces as we lose our ability to predict future threats? This paper explores an idea for another methodology: might it be possible to engineer into forces the characteristic of adaptability so that the forces would be able to adapt to the inevitable surprises that will confront them?

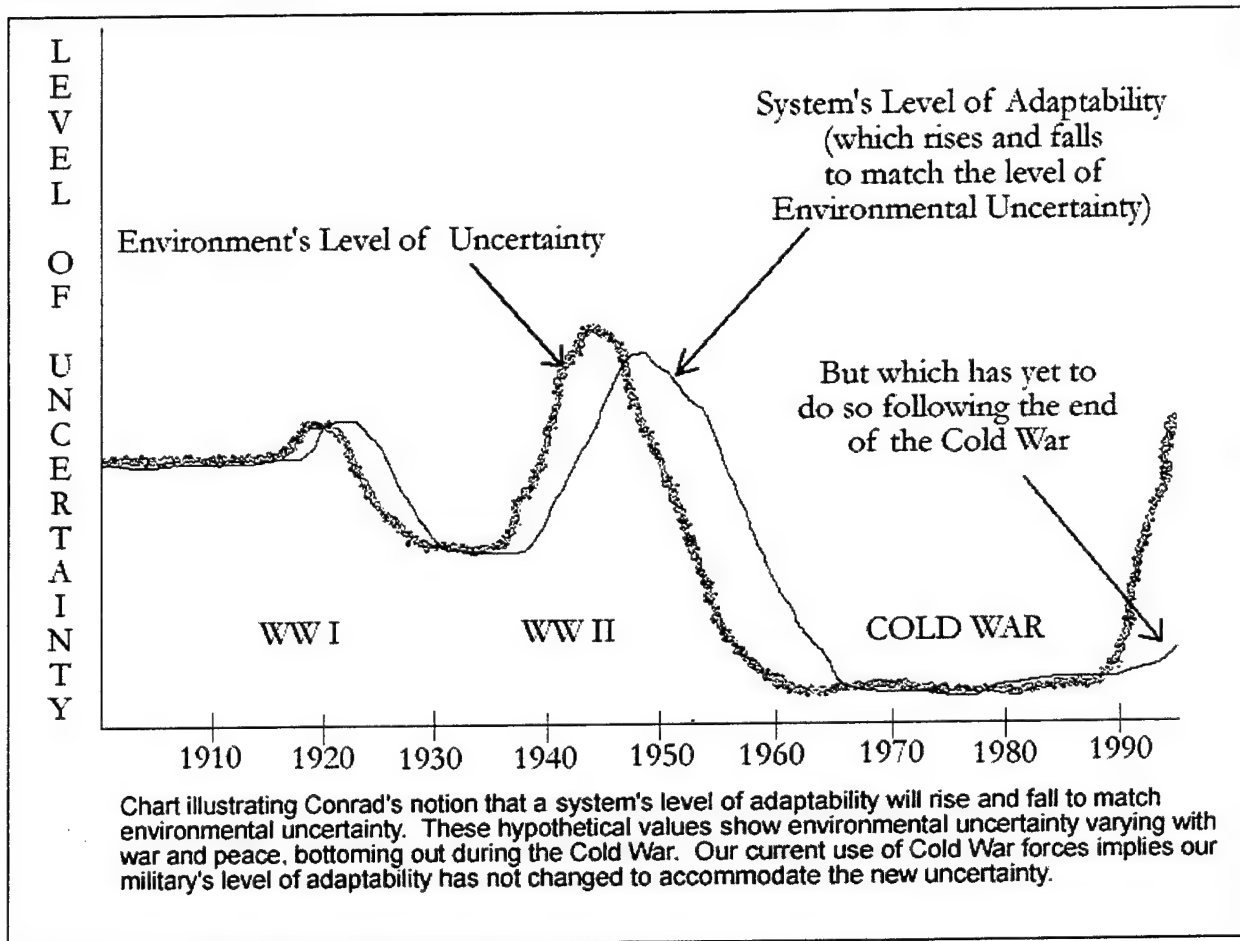


FIGURE 1 – ADAPTABILITY AND ENVIRONMENTAL UNCERTAINTY

Conrad's adaptability theory will be introduced later, but one of its conclusions is that "adaptability tends to fall to the actual uncertainty of the environment."⁹ As illustrated in Figure 1, this means a system's level of adaptability will rise and fall to match the environment's level of uncertainty. Our forces were built during the Cold War, when a polarized world ensured a lower-than-current level of environmental uncertainty. The U.S. knew who its enemy was, and that did not change much as the years passed. Conrad's theory suggests that the adaptability

of our forces was reduced to accommodate this low level of environmental uncertainty. The environment is once again more uncertain, but our Cold War-optimized forces, which were built to have low levels of adaptability, have not had their adaptability level rise to meet the new, higher level of environmental uncertainty. Conrad's theory suggests our forces are not adaptable enough to cope with the current environment.

If we continue to design forces based on threat forecasts which are becoming less reliable, then our forces will be at increased risk of not being able to cope with the threats that actually emerge, resulting in strategic failure. We may reduce this risk by increasing the adaptability of our forces and organizations to a level appropriate for the post-Cold War environment of today.

UNDERSTANDING ADAPTABILITY

The word "adaptability" represents an invented concept, not a discovered phenomenon. Its meaning varies between users and contexts, and these meanings compete for our attention. For example biologists study adaptability in the context of ecosystems and evolution while psychologists study adaptability in the context of personalities. Military concerns about adaptability center on changing threats and counter-threat capabilities. Social scientists look at values, culture, and social and political movements, including revolutions. Organizational scientists study organizational culture, hierarchy and degrees of specialization. Each of these specialists have developed useful insights about how adaptability impacts their own fields. In framing context-specific paradigms, however, each field has excluded from consideration other useful ideas about adaptability that bear directly on issues of concern. Each field has defined the issues of adaptability in ways that permit only certain questions to be asked inside the accepted paradigm. Some paradigms of adaptability will lead the operator to policy prescriptions that are opposite of what other paradigms would suggest. The interests of all would be served by a broader conception or theory of adaptability, such as is illustrated in Figure 2.

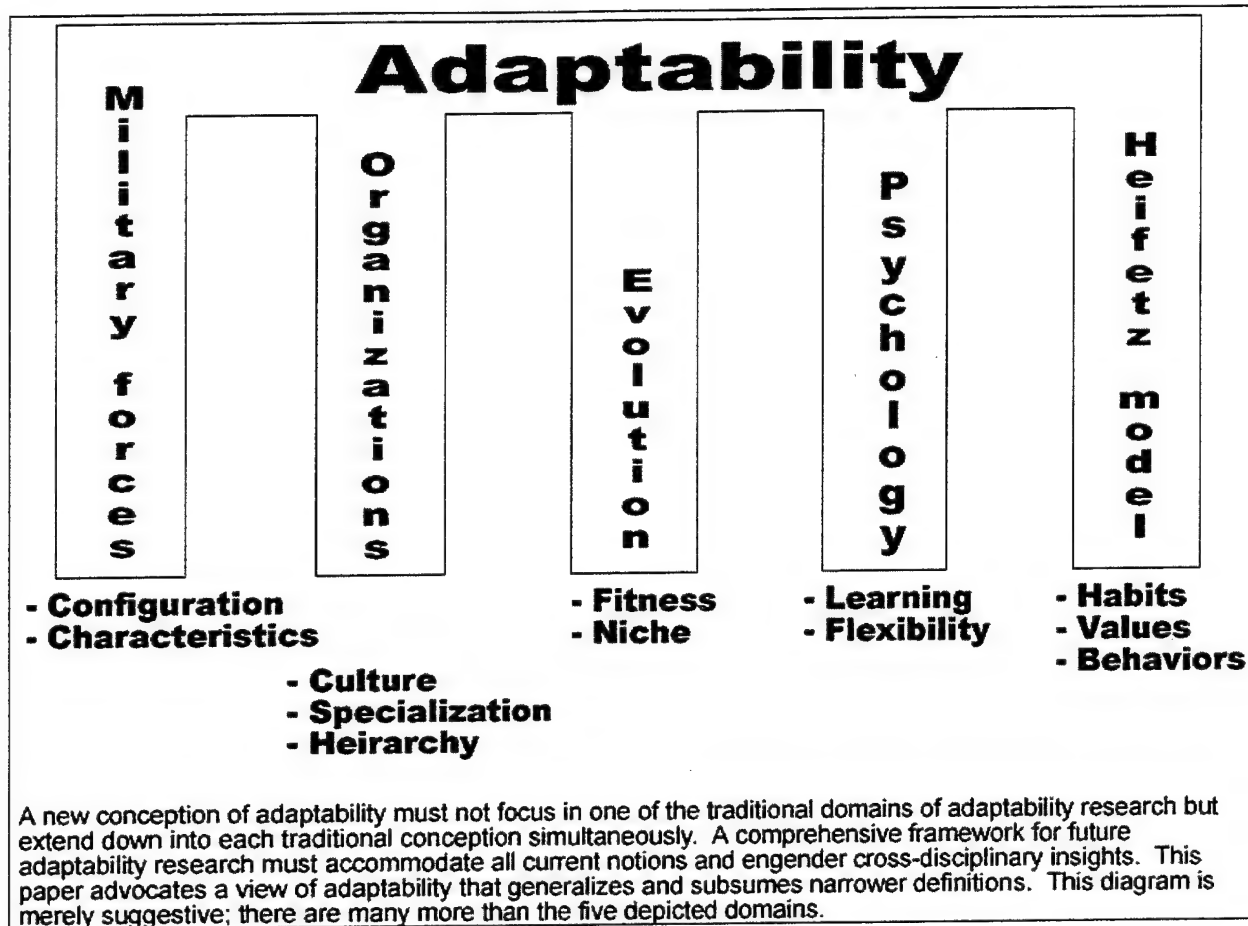


FIGURE 2 – A BROADER CONCEPTION OF ADAPTABILITY

THE METAPHOR OF BIOLOGY.

Biologists have articulated some interesting notions that might be appropriated for use by strategists. One interesting definition of 'adaptability' is: "the ability to cope with unexpected disturbances of the environment,"¹⁰ with 'adaptable' defined as "capable of functioning in an uncertain environment."¹¹ These definitions were developed by Michael Conrad in his book Adaptability: The Significance of Variability From Molecule to Ecosystem. Most of this theory is devoted to the context of biology, although he touches on economics and organizational theory. Conrad's theory is a self-contained mathematical theory that starts with fundamental identities and progresses to theorems and corollaries. Theorems are mathematically proved, and their implications are explained in English. Most of Conrad's math uses statistical expression of entropy of an environment and of biota (the combined flora and fauna in an environment) and biota transitions (changes of the biota from one state to another). Conrad shows that the adaptability of a population is the entropy of the most uncertain environment which does not

cause a catastrophic change in that population. Applying this metaphor to the military, one would measure the adaptability of a unit or organization by measuring the maximum environmental uncertainty the unit could tolerate.

According to Conrad, there are several general mechanism of adaptation; these mechanisms are the strategies for a system to contend with disequilibrium.

- Physical reliability. The components of a system function with greater precision. As applied to a military force, this implies better-engineered hardware and better-debugged software. As applied to a military service or department, it implies forces that are well-equipped and well-trained so they can execute their intended mission with little risk from internally-derived failure.
- Organizational reliability. Conrad intends this mechanism to refer specifically to the spatial and temporal organization of biological structures. By way of analogy, this speaks to organizational elements that enhance the robustness of a force or service. For example, if an organization has a high degree of internal specialization, then circumstances which require the organization to change its physical arrangement may degrade the organization's ability to function. This might happen if the organization were asked to deploy a large fraction of itself to a different theater. If an unspecialized organization were able to better function in this situation then it might be said to have greater organizational reliability.
- Behavioral uncertainty. This refers to adaptive behavior, and specifically refers to the system "assuming a mode of behavior which is functionally distinct and suited to the new environmental situation."¹² There are three sub-strategies:
 - *Constitutive adaptability*. Behavioral changes depend on structures which are always present, but which are programmed to respond to environmental changes. The changed behavior disappears when the stimulus subsides. Military examples of this mechanism include emergency procedures practiced by aircrews. They are transient behavioral changes, but the procedures are always in place.
 - *Inducible adaptability*. Environmental change induces behavioral change which is coordinated to structural change. An example would be a military organization tasked with *performing* fundamentally different tasks such that to execute the tasks reorganization is required.
 - *Selective adaptability*. This form of adaptability involves the selection and replication of successful processes, and characterizes longer term adaptation in the military. For example, the modification of the military to include a greater use

of joint task forces would be an example of the military selecting the joint task force organization as a successful process and replicating it because it was successful.

- Selective indifference. In this mode of adaptation the system copes with environmental change by dissipating the resulting disturbances or by isolating the system from the disturbances. Available techniques include spatial or temporal isolation. The armor of a tank allows the tank crew to be indifferent to the environment of light arms fire by providing for spatial separation between the incoming rounds and the crew. Maintaining minimum safe distances, depths, and altitudes are further examples of spatial isolation.

Note that in the case of tanks, increasing armor increases adaptability at the tactical and perhaps operational levels of war. Richard Sinnreich relates his experiments involving the 9th Infantry Division at Fort Lewis, Washington, where light forces exercised against heavier forces, remarking that light units "could not survive a tactical mistake. For us to win, our battle plan had to work perfectly."¹³ In short, the light units were less adaptable in an environment where unexpected events occur regularly. This is exactly contrary to the prevailing notion that the heavier the armor, the less adaptable are the forces, since heavier forces are less strategically deployable. This suggests a difference between tactical and strategic adaptability, and begs for the creation of a system of adaptability metrics to permit rigorous comparisons between light and heavy forces to determine which is truly more adaptable overall.

COSTS OF ADAPTATION.

One of the striking notions recurring across Conrad's theory is the notion that adaptability does not come for free. In discussing the ability to detect changes in the environment, Conrad says "anticipation is important from the standpoint of biological economy. As with the other mechanisms (behavioral uncertainty, indifference) it also involves a cost, or perhaps more aptly, an investment."¹⁴ He goes on to mention "all the various modes of adaptability, including modes of modifiability, independence, anticipation, and indifference, are more or less costly."¹⁵ "There are experiments...which suggest that superfluous adaptability in fact has a tendency to disappear in the course of evolution."¹⁶ Here is his assertion with the most profound impact on DoD planning for future forces: "organisms which can live in a wider variety of environments – hence which are more adaptability – could not function as efficiently as a less adaptable variant in any given environment."¹⁷ This implies "efficiency" is in competition with "adaptability" for our attention, and there are adverse consequences to "efficiency" winning the competition for our

attention. The direct tradeoff between efficiency and adaptability, coupled with the nature of our acquisition and planning systems that optimize efficiency, ensures a constant pressure to strip away adaptability from our forces and organizations. We are working as hard as we can to remove adaptability from ourselves.

It appears that in every case, adaptability is a characteristic that must be paid for. This suggests that when designing military organizations and systems, adaptability, like other characteristics such as speed, range, power, and efficiency, must be a design characteristic for which conscious trade-offs are made.

This attempt to impose structure on the various manifestations of adaptation and adaptability seems to meet a previously unmet need in national security studies. However, Conrad's theory of adaptability is rigorously developed primarily for the context of biology. It is tempting to apply the metaphor to the maximum degree possible, and in so doing, to risk misapplying the metaphor and drawing bad conclusions. Without understanding the highly technical and context-specific biological theory of adaptability, one can never know for sure how far to push the metaphor. For this reason, an analogous theory specific to the context of the military and security studies must be developed.

Still, the biological metaphor may be more robust than it first seems. For example, it may appear at first glance that a biological metaphor is ill-suited to the context of security studies since the time scale in biology is much larger and structural changes happen more slowly. However, this difference is not so much a limitation of the theory's application to the security context as it is a limitation of the degree to which living organisms may use "selective adaptability" as an adaptive response. Although living organisms may be limited in this respect, from Conrad's theoretical standpoint the full range of adaptive mechanisms apply to both security and biological contexts and may account for the full range of time scales and change rates involved.

Developing a rigorous theory for the security context is still important, because having a useful theory available actually enables the asking of more useful questions. For example, Conrad's theory suggests that a large bureaucracy will undergo specialization because it leads to increases in efficiency, but that if the environment changes, the organization may have to reverse the specialization:

specialization...is balanced by two disadvantages. More energy and resources are required for the development of the system in the first place. Once the system is developed, adaptability is more costly. One way of reducing the extra cost in terms of adaptability is to narrow the niche.¹⁸

Could it be that our large organizations (staffs of our CINCs and DoD) underwent specialization during the Cold War that needs to be, to some degree, reversed? If not now (perhaps the adaptive requirements are not great enough to warrant it), then perhaps it would be worth specifying the conditions that *would* justify such a change. We could then monitor the specified variables so we recognize when changes are appropriate.

Conrad's thoughts on "narrowing the niche" are particularly relevant in today's environment of a Quadrennial Defense Review. The question of "who is responsible for homeland defense" directly implies a niche narrowing or broadening for the organizations tasked with or excused from this mission. The current debate on what constitutes the appropriate use of force can be viewed from the perspective of niche expansion/contraction: restricting the U.S. military to primarily fighting and winning the nation's wars would constitute a narrow niche, while the routine use of military force in peacekeeping and other contingency operations (in addition to war-fighting) would constitute niche expansion. Whatever the articulated merits of military force employment are, military organizations have organizational imperatives to reduce their niche; doing so decreases the costs of adapting to the changing world environment, given DoD's highly specialized and differentiated organizations and forces.

WHAT CHANGES DURING ADAPTATION?

It helps to know what constitutes the adaptation process if one is trying to help an organization adapt. In fact, if one has an incorrect notion of what changes during adaptation, one may end up misdiagnosing the state of adaptation and unwittingly set up barriers or otherwise undermine it.

Space does not permit treatment of this question across its legitimate breadth, but one critical insight relating to organizational adaptation can be made. From the perspective of the leader, the need to adapt is a problem requiring solution. But the work-day of a leader is filled with problems requiring solution, and only some of these relate to the need to adapt. The leader's challenge, then, is to distinguish adaptive challenges from other problems demanding solution without adaptation. Dr. Ronald Heifetz of Harvard University offers some help here, introducing his categories of work, which distinguish between "adaptive" and "technical" work.¹⁹ These categories, named "Type I," "Type II," and "Type III" situations, are useful for recognizing and identifying adaptive challenges.

"Type I" situations are characterized as "technical" work, where problem definition and solution are clear. For example, if a task force needs to strike an enemy force, then experts trained in "targeteering" apply their expertise until the problem is "solved" and a strike execution

plan is developed. In fact, much of what the military does is technical work. Standardization of tactics, operations, and strategy is an attempt by the military to structure most or all of their tasks as technical work. People in the military feel very comfortable doing technical work; so much so that they may do technical work when in a Type II or Type III situation.

In a Type II situation the problem is clear but the solution is not. An example would be the aging of a fleet of aircraft. The problem is well known and can be specified in detail: degree of corrosion, number of landings logged, service life remaining, etc. But no pat solution exists, and the range of remedies is wide open: solicit Congress for funds, or revise operational plans to require fewer aircraft, or extend aircraft life through inspection programs, and so forth.

A Type III situation is truly "adaptive": the problem is not clear and no technical fix or "correct" course of action is available. "Learning is required both to define problems and implement solutions."²⁰ Addressing Type III situations is often beyond the experience of those in the military, who may consequently develop a cognitive bias towards perceiving all military situations as Type I or Type II and fail to recognize a Type III situation, which requires a different approach. A non-military context may offer the best example to illustrate a Type III situation. Here is Dr. Heifetz's own example: a physician treating a terminal cancer patient:

...treating the illness is too narrow a way for the patient and the physician to define the task. It applies a technical formulation to a nontechnical problem. When critical aspects of the situation are probably unchangeable, the problem becomes more than the medical condition. For example, if the patient's diagnosis is an advanced state of cancer in which the likelihood of cure is remote, it may be useless – indeed, a denial of reality – to define the primary problem as cancer. Cancer, in this case, is a *condition*. To the limited extent that it can be treated at all, it is only part of the problem. To define cancer as the primary problem leads everyone involved to concentrate on finding solutions to the cancer, thus diverting their attention from the real work at hand. The patient's real work consists of facing and making adjustments to harsh realities that go beyond his health condition and that include several possible problems: making the most out of life; considering what his children may need after he is gone; preparing his wife, parents, loved ones, and friends; and completing valued professional tasks.²¹

Training, in the military, serves the function of giving individuals the knowledge and skills they need to do technical work in Type I situations. There needs to be a discussion about how to prepare leadership to better recognize and deal with Type II and Type III situations.

How does one easily differentiate between technical and adaptive situations? Heifetz offers this test: "Does making progress on this problem require changes in people's values, attitudes, or habits of behavior?"²² This test helps identify an adaptive challenge and also indicates what must be changed as part of the adaptive process.

Note that the word "value" has broader meaning than may be commonly used colloquially. Military people may think of "values" as referring only to lofty principles such as "truth," "honor," and "commitment." While these are indeed "values," Heifetz is talking about a much wider range of valuations, to include preferences and biases. Wearing short hair, being on-time or early to social engagements, and being more concerned with foreign policy than domestic economic policy would all be counted as typical military values under this formulation.

This assertion that values-change is central to adaptation in organizations and societies is often rejected by military officers hearing it for the first time. However, the notion becomes more recognizable as a useful idea if this broader notion of what constitutes "values" is used. But the validity of this idea still may not be accepted at first hearing. To be comfortable that this idea is a useful and powerful conceptual tool, one would need to attempt using it in a variety of case studies. As space does not permit an exhaustive evaluation of this idea, the reader may want to further review Heifetz's book and other related case study materials. Having thus introduced the notion, however, this paper assumes its utility.

Once the notion is accepted that human adaptation requires changes in values, attitudes, or habits, a key notion follows:

To clarify a complex situation...requires multiple vantage points, each of which adds a piece to the puzzle. Just as clarifying a vision demands reality testing, reality testing is not a value-free process. Values are shaped and refined by rubbing against real problems, and people interpret their problems according to the values they hold. Different values shed light on the different opportunities and facets of a situation. The implication is important: *the inclusion of competing value perspectives may be essential to adaptive success.*²³

This leads to a different imperative than many in the military instinctively seek. Many in the military assume they do (or should) have the same values and seek consensus by creating working-groups of like-minded people. In other words, they see the only legitimate differences as being disagreements on the facts of a problem and perceive as illegitimate any disagreements on values. If the process of real adaptation requires clashing and changing values, then working-groups should be constructed with people holding and articulating opposing values, yet open-minded enough to adapt. Heifetz further adds: "without conflicting frames of reference, the social system scrutinizes only limited features of its problematic environment."²⁴ A like-minded group, searching for solutions to a problem, may not cast the net wide enough to find the available solution.

WHY ADAPTABILITY IS UNDERVALUED

Currently there is no yardstick to measure how much adaptability exists or is required in any given national security context. Unfortunately, it is hard to place much value on adaptability without such a metric. Without an objective measure with which to weigh options, it is hard to find oneself compelled to act towards advancing adaptability. On the other hand, an excellent metric exists for measuring efficiency: dollars. The utility of this metric forces attention along the efficiency dimension; as a consequence, efficiency is heavily emphasized in DoD. Also, good metrics exist for effectiveness: the number of battles won, or the number of foreign policy objectives achieved through the use of force.

If a metric for adaptability were found, one could plot adaptability versus efficiency and effectiveness to derive something representing "value." Unfortunately, Conrad suggests direct measurements of adaptability may never be possible,²⁵ requiring the use of relative, vice direct measurements. Human nature will be to continue favoring the characteristics of efficiency and effectiveness simply because they have "harder" metrics. Our challenge will be to recognize that efficiency and effectiveness are not *worth* more of our attention than is adaptability, and to devise effective measures that counteract our natural inclination to misallocate our attention.

BARRIERS TO INCREASING ADAPTABILITY

If one accepts the premise that adaptability in DoD must be increased, the problem becomes how to do so. While the ultimate goal should be to develop an exhaustive list of actions that promote adaptability, space limits treatment to only two areas where obstacles to successful adaptation exist that might be mitigated.

THE CHALLENGE FROM TRADITION

Culture is the main method of adaptation for humans. Yet, gauging cultural change is difficult because many elements of culture are invisible to those immersed in it. Because culture is, in part, our set of values, we will, by definition, always value the components of our culture, even when they are dysfunctional or obstruct adaptation. One element of culture particularly difficult to assess is the value of tradition.

Technology has forced the military to abandon traditional values in the past and will continue to at an increasing rate. But, as Eliot Cohen noted:

The services cling to established ways of war, and to combinations of technology, organization, and personnel systems that have come to acquire value in and of themselves – even if they are no longer entirely functional.²⁶

A love of tradition has evolved into our military culture. To see why this is so, one must consider the social function of tradition, which serves to communicate values (i.e., culture) to new members of a society. Tradition may take the place of an elder who otherwise would *decide* which values are good. Such a surrogate is necessary in a military outfit that has few if any elders.

The utility of using tradition to decide which values to hold varies with context. As an arbiter of values, tradition will be most useful when there is little or no environmental change, because things previously judged valuable will likely continue to stay valuable. During periods of change, however, tradition will continue to communicate information about values, but not necessarily *good* information. Therein lies the central problem with tradition for today and the future: tradition cannot discriminate between those past values that are still functional and those have, by way of environmental change, become dysfunctional.

For example, in the past it was functional to value having children eat all the food that was served onto the child's plate. This value was created in an environment of food scarcity, and it was preferable to convert excess food to fat rather than to throw it away. Following this tradition used to yield a benefit (conservation of energy) and incur little cost (there was little chance of getting fat). Periods of food scarcity are no longer a threat; rather, obesity looms as a new threat. The traditional value of "cleaning the plate" has outlived its usefulness. Unfortunately, not everyone has adapted, and some parents continue to browbeat their overweight children into eating more food than they desire. Following this tradition now has a cost (it causes obesity) while yielding no benefit.

This example is very relevant to the military. Military culture is filled with innumerable similar examples of behavior and values rooted in a bygone environment. Military culture is, in fact, largely the aggregation of traditional values. The utility of specific values often changes when the environment changes, and, as discussed, today's environment is changing at an accelerating pace. The effect is to increase the costs of using tradition as a method to select and communicate values.

This is not to advocate radicalism; organizations have limits to the rate at which they can change. Michael Evans, citing historical failures of military radicalism, makes a strong case that "twenty-first century military institutions must respond with a considered transformation strategy that blends continuity with change."²⁷ Also, many traditional values merit keeping. But the costs of using tradition as a method to select which values to keep have risen, while the benefits have been shrinking. At a certain point, using tradition as a means to decide and communicate values becomes too expensive. Interestingly, the official U.S. Navy core values were changed

around 1992 from "Integrity, Professionalism, and Tradition" to "Courage, Honor, and Commitment."²⁸ Although the institution of the Navy has thus tacitly acknowledged the reduced value of tradition in today's military, a similar acknowledgement has yet to happen in much of the broader military culture, which still reveres tradition. As environmental change accelerates, this cultural shift appears inevitable.

THE CHALLENGE FROM UNIFORMITY

Conrad concludes (from his biological adaptability theory): "the...increase in diversity implies a potential increase in community adaptability."²⁹ Increased diversity provides a strategy to increase adaptability. "Diversity" here refers to diversity along every dimension: diversity of types of forces, types of weapons, force characteristics, ideas, strategic theories, values, etc. Increasing diversity along all these dimensions runs exactly opposite to consolidating and streamlining activities, which aim to increase efficiency and which may simultaneously decrease adaptability.

One of the most compelling cases of adaptive failure is China over the last few hundred years up to the first part of this century. This example, offered by Dr. Jared Diamond, illustrates the dynamic between diversity and adaptability:

medieval China [led] the world in technology. The long list of its major technological firsts includes cast iron, the compass, gunpowder, paper, printing, and many others...It also led the world in...navigation, and control of the seas. In the early 15th century it sent treasure fleets, each consisting of hundreds of ships up to 400 feet long and with total crews of up to 28,000, across the Indian Ocean as far as the east coast of Africa, decades before Columbus's three puny ships crossed the narrow Atlantic Ocean to the Americas' east coast. Why didn't Chinese ships proceed around Africa's southern cape westward and colonize Europe, before Vasco da Gama's own three puny ships rounded the Cape of Good Hope eastward and launched Europe's colonization of East Asia? Why didn't the Chinese ships cross the Pacific to colonize the America's west coast? Why, in brief, did China lose its technological lead to the formerly so backward Europe?³⁰

The answer to this question involves many variables, but a critical reason was the lack of diversity along the political dimension. China had been unified for most of the time since 221 B.C.,³¹ whereas Europe was fragmented into hundreds of political entities. The consequence of unification in China was to permit the mistakes of central authorities to go uncorrected. In contrast, in Europe any government adopting an unpopular but good idea obtained a real advantage. Other governments (that may have

previously rejected the unpopular idea) were threatened by this advantage and were compelled to adopt the unpopular idea themselves.

The activities of seagoing fleets in China were suspended by a political decision as a consequence of "a power struggle between two factions at the Chinese court. Because the region was politically unified...[the] decision became irreversible."³² Chinese sea power withered and China withdrew into introversion. In contrast, Columbus was rejected by several sovereigns before eventually finding sponsorship; when the competitive advantages of Columbus' ideas became apparent, they were copied.

From time to time the Chinese court decided to halt other activities besides overseas navigation: it abandoned development of an elaborate water-driven spinning machine, stepped back from the verge of an industrial revolution in the 14th century, demolished or virtually abolished mechanical clocks after leading the world in clock construction, and retreated from mechanical devices and technology in general after the 15th century.³³

Europe's diversity of authority may have been a less efficient form of governance than China's consolidated authority that could speak with one voice, but it was certainly more adaptable. Conrad's theory predicts this: "Innovative adaptability increases as the size of the idea pool increases and as this pool is broken up into more intercommunicating subpools, each capable of independent directions of investigation."³⁴

This lesson should be remembered when calls are made for consolidating centers of authority. Consider this recent idea by a former Vice Chairman of the Joint Chiefs of Staff:

...the true Revolution in Military Affairs requires a transformation of the U.S. military's scattergun approach to combat doctrine, strategy, and tactics. It means we must transform the separate military institutions that draft military doctrine, and consolidate internal education and training into a single entity that can articulate a truly common vision.³⁵

This single entity would have the capacity to institutionalize mistakes in the same way that the 16th century Chinese court did. Additionally, the reduction of the number of legitimate voices would deprive the idea-pool of values conflict. As discussed previously, "*the inclusion of competing value perspectives may be essential to adaptive success.*"³⁶ Consolidating as Admiral Owens advocates would greatly winnow the set of values down and vastly reduce the scope of options examined, perhaps causing the U.S. to overlook available solutions to future adaptive challenges.

There are a number of well-known examples supporting this view. The U.S. Marine Corps and U.S. Army have developed different doctrine over the years, and periodically one service

will borrow doctrine from the other. When this happens it illustrates what organizations of competing values can produce that one unitary organization cannot. After the idea-transfer, both organizations are better off than either would have been alone. U.S. Navy aviation and the U.S. Air Force have a similar relationship.

Complementing this benefit of multiple sources of values and new ideas is the value of competition between the organizations for scarce resources. Harvey Sapolsky notes:

...competition spurs innovation. When there is expectation of significant reward or loss, the services may offer up not only information about their bureaucratic rivals but new ideas, ways of both improving their military capabilities and protecting their roles and missions. It was the Navy's fear of losing the nuclear deterrent mission entirely to the Air Force in the 1950s that gave us the Polaris submarine that in turn reduced the need to deploy hundreds of vulnerable and costly strategic bombers and most of the liquid fueled missiles that the Air Force was developing.³⁷

The problem with Admiral Owen's call for a "single entity that can articulate a truly common vision" is that visions are frequently wrong or just not creative enough. Multiple entities provide a benefit for which there is no substitute: the competition and conflict that they engender have a better chance of finding the adaptive path through a changing environment than anything a single entity can provide. This is evident from both theory and experience. DoD should not streamline this functional area else it further strip away adaptive capacity.

SUMMARY.

The U.S. must increase the adaptability of its organizations and forces or suffer strategic failure. Although difficult to measure with the currently deficient state of adaptability theory and metrics, the level of adaptability of our forces and organizations is almost certainly at a level inappropriately low for the current level of environmental uncertainty present in the world today. This mismatch arises, in large part, because our procurement and planning methodologies have available measures to optimize efficiency and effectiveness but not adaptability.

Unfortunately, actions taken to optimize efficiency often (if not always) undermine adaptability. This occurs because adaptive capacity, like most capacities, has an associated cost. Since the cost of adaptability is easily measurable but the benefits are not, the overall value of adaptability is underestimated and the characteristic of adaptability is consequently reduced. DoD must find a way to recognize and overcome this dynamic or it will be left with forces and organizations that are chronically optimized for the wrong mission, are inflexible, and are worth less than they cost.

DoD personnel often unwittingly set up barriers or undermine adaptation by misunderstanding what it is and working at cross-purposes to it. Current calls for consolidation of training and doctrine commands is an important example of this. Failing to recognize when values have been rendered dysfunctional by environmental change is another example. Education may mitigate or reverse many of these tendencies, but typical DoD training activities, which emphasize technical work appropriate to "Type I" situations, generally lead to failure to recognize even the existence of an adaptive challenge. DoD will be better able to advance its own adaptability if its leaders learn more about and pay more attention to what adaptation is and how it happens.

Creating a rigorous theory of adaptability for the national security context along the lines of Michael Conrad's theory could pay substantial dividends. Such a theory might enable powerful analysis and lead to new and significant insights.

DoD has been successful over the last few decades operating with its current methodologies and paradigms and this success may create difficulties for those advocating the need for change. Pursuing fundamental research about adaptability may contribute towards greater understanding about what the stakes are and how to configure U.S. military forces and organizations to cope with the challenges of an uncertain future.

Word Count: 5994.

ENDNOTES

¹ "DefenseLINK - Official Web Site of the U.S. Department of Defense," 14 July 2000. Available from <<http://www.defenselink.mil/admin/about.html>>; Internet; accessed 12 March 2001. "The mission of the Department of Defense is to provide the military forces needed to deter war and protect the security of our country."

² George J. Tenet, "Statement by the Director of Central Intelligence regarding the Disclosure of the Aggregate Intelligence Budget for Fiscal Year 1998," The Central Intelligence Agency, 20 March 1998. Available from <http://www.odci.gov/cia/public_affairs/press_release/archives/1998/ps032098.html>; Internet; accessed 22 October 2000. The United States budgeted \$26.7 billion towards intelligence in fiscal year 1998.

³ Alvin Toffler, Future Shock, (New York: Bantam Books, 1970), 11-35.

⁴ Director of Central Intelligence George J. Tenet, "Worldwide Threat 2001: National Security in a Changing World," statement before the Senate Select Committee on Intelligence, 07 February 2001. Available from <http://www.cia.gov/cia/public_affairs/speeches/UNCLASWWT_02072001.html>; Internet; accessed 03 March 2001.

⁵ How The Army Runs: A Senior Leader Reference Handbook, 1999-2000, (Carlisle, PA: U.S. Army War College, 1999), 5-3. "our ability to envision future operational concepts and capabilities is challenged by the rapid pace of environmental change and the time required to change the primary long lead elements of the institution: doctrine, materiel, and organization."

⁶ Ibid., 5-11. "Organizational requirements are...derived from...assessments...to identify whether a new or modified organization is required on tomorrow's battlefield."

⁷ Ibid., 5-4. "Material changes can require 15 years to develop and field. Organizational changes requires 4-8 years. Doctrine itself requires 2-4 years."

⁸ Chairman of the Joint Chiefs of Staff Instruction 3010.02, Joint Vision Implementation Master Plan, (Washington, 09 December 1998), 8. Available from <http://www.dtic.mil/doctrine/jel/cjcsd/cjcsi/3010_02.pdf>; Internet; accessed 03 March 2001. "Desired Operational Capability (DOC)...[they] are the products of an examination of the future collaborative environment and Twenty-first Century challenges."

⁹ Michael Conrad, Adaptability: The Significance of Variability From Molecule to Ecosystem, (New York: Plenum Press, 1983), 132.

¹⁰ Ibid., 7.

¹¹ Ibid., vii.

¹² Conrad, 110.

¹³ Richard Hard Sinnreich, "The Limits of Lightness," The Washington Post, September 26, 2000, 27.

¹⁴ Conrad, 117.

¹⁵ Ibid., 125.

¹⁶ Ibid., 108.

¹⁷ Ibid., 109.

¹⁸ Ibid., 262-263.

¹⁹ Ronald A. Heifetz, Leadership Without Easy Answers, (Cambridge, MA: Harvard University Press, 1994), 76.

²⁰ Ibid., 75.

²¹ Ibid., 75.

²² Ibid., 87.

²³ Ibid., 23

²⁴ Ibid., 33.

²⁵ Conrad, 57. "It is clear that direct measurements of adaptability are in general quite impractical. The problem of the theory of biological adaptability is not to make such direct measurements but rather to establish connections between adaptability and more conveniently measurable...properties, or to compare measurable...properties of systems which are prepared in such a way that their adaptability (in relation to some standard) is known."

²⁶ Eliot Cohen, "Defending America in the Twenty-first Century," Foreign Affairs, Vol. 79 No. 6 (November-December 2000), 52.

²⁷ Michael Evans, "Fabrizio's Choice: Organizational Change and the Revolution in Military Affairs Debate," National Security Studies Quarterly, Volume VII, Issue 1 (Winter 2001), 20.

²⁸ John Hagan, "Honoring Tradition," Naval Institute Proceedings, (Annapolis: U.S. Naval Institute, 1997). Available from <<http://www.usni.org/Proceedings/Articles97/PROhagan.htm>>; Internet; accessed 03 March 2001.

²⁹ Conrad, 304.

³⁰ Jared Diamond, Guns, Germs, and Steel; the Fates of Human Societies, (New York: W. W. Norton & Company, 1997), 411-412.

³¹ Ibid., 413.

³² Ibid., 412.

³³ Ibid., 413.

³⁴ Conrad, 364-365.

³⁵ Admiral Bill Owens and Ed Offley, Lifting the Fog of War, (New York: Farrar, Straus and Giroux, 2000), 23-24.

³⁶ Heifetz, 23.

³⁷ Harvey M. Sapolsky, "Interservice Competition: The Solution, Not the Problem," Joint Force Quarterly, (Spring 1997), 51.

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